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AIC-218
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LIST OF PUBLICATIONS AND PATENTS WITH ABSTRACTS

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ALFALFA

STABILITY OF CAROTENE IN ALFALFA MEAL. EFFECT OF ANTIOXIDANTS. C. R. Thompson, Indus. and Engin. Chem. 42(5):922-925, May, 1950. Fifty-four compounds were tested at a level of 0.125 percent in dehydrated alfalfa meal. Relative stabilizing powers of antioxidants appear to be related to their chemical structure. Five compounds showed marked superiority over the others.

ANTIBIOTICS

AIC-168, ANNOTATED BIBLIOGRAPHY OF SUBTILIN: Assay, Microbiological Production, Purification and Chemistry, Biological Activity, and Related Compounds. J. C. Lewis, revised Feb. 1950. Originally issued October 1947 and revised March 1948. This bibliography with abstracts covers all published work on subtilin to date, from other institutions as well as the Western Regional Research Laboratory.

ALCOHOL DERIVATIVES OF SUBTILIN. Patent No. 2,495,743 to J. C. Lewis and E. F. Jansen, patented Jan. 31, 1950. The antibiotic, subtilin, is esterified with alcohols such as methanol, ethanol, ethylene glycol. The esters are more soluble than subtilin itself and in some cases have increased biological activity.

METHOD OF PREPARING SUBTILIN. Patent No. 2,508,378 to R. E. Feeney and J. A. Garibaldi, patented May 23, 1950. Subtilin is produced in high yields by controlling the concentration of mineral nutrients in the medium in which B. subtilis is grown.

PRESERVATION OF FOODS WITH ANTIBIOTICS. (See under Food Processing.)

FOOD PROCESSING (General)

ROLE OF FOOD RESEARCH AT THE WESTERN REGIONAL RESEARCH LABORATORY IN FOOD PROCESSING IN THE WEST. M. J. Copley. Presented before Southern California Section, Institute of Food Technologists, Los Angeles, Feb. 17, 1950, and published in I.F.T. Proceedings. Mimeographed copies are available. A brief discussion of aims of food research of the Bureau of Agricultural and Industrial Chemistry, with summaries of certain food investigations in the Western Region, including dehydrofreezing, fruit purees, glucose-free dried egg, froth-flotation cleaning, pectic enzymes, and use of antibiotics in food preservation.

PRESERVATION OF FOODS WITH ANTIBIOTICS. I. THE COMPLEMENTARY ACTION OF SUBTILIN AND MILD HEAT. A. A. Andersen and H. D. Michener, Food Technol. 4(5):188-189, May, 1950. A new principle in food preservation is announced based on two principles: (a) destruction of non-spore-forming bacteria, yeasts, fungi, and enzymes by mild heat treatment, and (b) destruction of spore-forming bacteria with subtilin or other antibiotics. Experiments are reported.

A STUDY OF THE EFFECT OF CLARIFICATION ON DETERMINATION OF REDUCING SUGARS IN PLANT MATERIALS. A. Bevenue and B. Washauer, Jour. Assoc. Offic. Agr. Chem. 33(1):122-127, Feb. 15, 1950. Alcoholic extracts of some plant materials (including juices from pear cannery waste) can be analyzed for reducing sugars without clarification by the neutral lead acetate procedure.

HOW TO TEST YOUR AIR-BLAST FREEZER. E. Lowe, G. S. Smith, and O. H. Spaugh, Food Indus. 22(4):638-641, April, 1950. Methods for testing the performance of commercial air-blast freezers, including air velocities, power consumption, air temperatures, piece-center temperatures, and other variables are described. Instruments used include hot-thermocouple anemometers, special static pressure heads, and a multi-point electronic pyrometer. Readings are recorded remotely.

ACTIVITY OF WETTING AGENTS--TEMPERATURE EFFECTS. F. H. Lucas and A. H. Brown, Food Tech. 4(4):121-124, April, 1950. Effect of temperature on wetting power was determined for various surface-active agents in both dilute sulfuric acid and water solutions. Temperature effects were large for the most common type of agent, and were increased by decreasing concentration of agent and by presence of acid. The selection and use of wetting agents in processing operations are discussed.

*PROTECTIVE PACKAGING WITH MOLTEN THERMOPLASTICS. W. Rabak, Amer. Management Assoc. Packaging Series 35, 16-20, 1950. Thermoplastic dip coatings of plasticized microcrystalline paraffin have been found to provide a dependable shatter-proof protective covering for frozen foods, which is water-vapor resistant and essentially airtight.

PROCESS OF DRYING FRUIT OR VEGETABLE MATERIALS CONTAINING ADDED METHYL CELLULOSE. Patent No. 2,496,278 to C. W. Eddy, patented Feb. 7, 1950. Methyl cellulose is added to fruit or vegetable juices prior to spray drying to give a dried product of decreased hygroscopicity.

FRUITS

AIC-263, COMMERCIAL FRESH PRUNE PRODUCTS--TECHNICAL FEASIBILITY. Processing Studies: L. H. Walker, J. D. Ponting, and W. F. Talburt. Probable Costs: C. L. Rasmussen, May, 1950. Fresh prunes have been used experimentally for the manufacture of clarified and unclarified juices, puree, and 2.5-fold concentrate. Information from studies on quality and probable costs is reported.

AIC-270, APPLICATION OF WAX TREATMENT TO BERRY BOXES (HALLOCKS) TO CONTROL MOLDS. E. J. Barta and E. Lowe, April, 1950. A successful method for the application of wax coating to berry picking boxes (called hallocks in the Northwest) is described. This coating is markedly beneficial in control of molds of picked fruit. A machine for application of the coating is described with suggested specifications. (Supersedes AIC-239.)

TEXTURE PROBLEMS IN RASPBERRY CANNING. W. F. Talburt, C. C. Nimmo, M. J. Powers, and C. D. Schwartze, West. Canner and Packer 42(6):16, June, 1950. Canning experiments with the Washington variety of raspberry (which has largely supplanted the Cuthbert in the Northwest) suggest that use of a shaker washer, especially with fairly long holding periods while berries are wet, is the principal cause of mushiness in canned product. Use of still cooking instead of agitation and reduction of usual cooking time appear to have no effect on mushiness.

LABORATORY STUDIES ON FACTORS AFFECTING LEACHING LOSSES DURING THE PROCESSING OF APPLES. A. M. Mylne and C. G. Seegmiller, Food Technol. 4(2):43-46, Feb., 1950. Apple slices were immersed in water and in solutions of sodium chloride, calcium chloride, and sulfur dioxide for varying times, followed by chemical analysis of leach liquid for total sugar. Leaching losses ranged from about 5 percent of sugar present in the apple (1 minute leach), to about 50 percent (24 hour leach).

A METHOD FOR DETERMINATION OF CALCIUM IN APPLE FIRMING BATHS. K. T. Williams and A. Bevenue, Fruit Prod. Jour. 29(5):136-137, Jan., 1950. A modified soap method for the determination of calcium in apple-firming baths, suitable for processing plant use, is described.

BACTERIOLOGICAL STUDIES ON COMMERCIALLY PREPARED FROZEN ORANGE JUICE STORED AT -10°F. E. R. Wolford, Food Technol. 4(6):241-256, June, 1950. Plate counts of frozen orange juice followed over a 43-week storage period decreased in a roughly logarithmic manner. Between the second and forty-third week, indices of coliforms varied from sample to sample and showed no definite downward trend. Most were Aerobacter species but some resembling Escherichia coli were found.

SUGARS OF CITRUS JUICES. R. M. McCready, E. D. Walter, and W. D. Maclay, Food Technol. 4(1):19-20, Jan., 1950. Analyses for sugars in lemon, orange, and grapefruit juices by paper chromatography shows the presence of only sucrose, glucose, and fructose. Their identities were confirmed by independent means. Fermentation of the citrus juices with Torula monosa after inversion of sucrose removes all traces of sugars. Nearly 100 percent of the solids from deionized, lyophilized Valencia orange juice is accounted for by analysis.

PECTIN

GELATION PROPERTIES OF PARTIALLY ACETYLATED PECTINS. E. L. Pippen, R. M. McCready, and H. S. Owens, Jour. Amer. Chem. Soc. 72(2):813-816, Feb., 1950. A series of pectin acetates were prepared. When a 2.6 or more percent acetyl is present in the molecule, ability of pectin to form high-solids gels is markedly reduced if not eliminated. Jellying ability was restored by partial acid hydrolysis. Acid hydrolysis of sugar beet pectin produced a jellying pectin.

THE STRUCTURE OF (I) SOME PECTIN ESTERS AND (II) GUAR GALACTOMANNAN. K. J. Palmer and M. Ballantyne, Jour. Amer. Chem. Soc. 72(2):736-741, Feb., 1950. The small-angle diffraction from pectin acetate, propionate, butyrate, laurate, myristate and palmitate esters are recorded. The increase in interchain separation per carbon atom in the ester chain is 0.78 Å. A method is described for producing highly oriented films from the galactomannan obtained from guar. A polymannose chain with side chains of one galactose unit on every second mannose unit is in best accord with the X-ray data.

LOW-METHOXYL POLYVALENT METAL PECTINATE FIBERS. Patent No. 2,495,757 to H. S. Owens and H. Lotzkar, patented Jan. 31, 1950. A solution of a low-methoxyl pectin is extruded through a spinneret into a bath of a polyvalent metal salt, such as calcium chloride, to produce filaments of polyvalent metal pectinate.

PROCESS OF NEUTRALIZING PECTINIC ACID. Patent No. 2,495,796 to H. S. Owens, R. M. McCready, and W. D. Maclay, patented Jan. 31, 1950. A low-methoxyl pectinic acid in the solid state is contacted with gaseous ammonia to produce a partially neutralized pectinate of increased solubility and stability.

ISOLATION OF LOW-METHOXYL PECTINS. Patent No. 2,496,306 to H. S. Owens, R. M. McCready, and W. D. Maclay, patented Feb. 7, 1950. Low-methoxyl pectins are isolated from their aqueous solutions by adding an alkali metal salt, such as sodium chloride, whereby to precipitate the low-methoxyl pectin.

ACID LEACHING OF PECTINOUS MATERIALS. Patent No. 2,502,477 to H. S. Owens, patented April 4, 1950. This patent relates to the isolation of low-methoxyl pectinic acids from citrus peel in which the naturally occurring pectin has been partially demethoxylated in situ. The peel is first leached with acid to remove calcium ions then leached with water to extract the pectinic acids.

NEUTRALIZATION OF PECTINIC ACIDS WITH SODIUM BICARBONATE. Patent No. 2,503,258 to R. P. Graham and A. D. Shepherd, patented April 11, 1950. A low-methoxyl pectinic acid gel is mixed with sodium bicarbonate to produce a partially neutralized, free-flowing pectinate product.

POULTRY

PRODUCTION OF A FRIABLE MEAL FROM FEATHERS. C. H. Binkley and O. R. Vasak, AIC-274, June, 1950. Treatment of fresh waste feathers with steam in a pressure cooker, with subsequent drying and grinding, yields a meal suitable for use as an organic fertilizer, a mixed-fertilizer component, or in the preparation of a plaster retarder. Other uses may be developed later.

SHEAR--NOT PRESSURE--HARMS EGG WHITE. L. R. MacDonnell, H. L. Hanson, R. B. Silva, H. Lineweaver, and R. E. Feeney, Food Indus. 22(2):273-276, Feb., 1950. Damage to liquid egg white when pressure-homogenized was shown to be caused by mechanical action and not be the pressure itself. Quantitative studies of types of damage to physical and functional properties were made.

THE FREEZING PRESERVATION OF TURKEY MEAT STEAKS. A. A. Klose, H. L. Hanson, and H. Lineweaver, Food Technol. 4(2):71-74, Feb., 1950. Two methods of preparing turkey steaks, with respective yields, are described. The frozen storage stability of the two types of steaks was determined by organoleptic and chemical tests. Variables studied were temperature of storage, packaging materials, added fat, and repeated freezing and thawing.

EFFECT OF PREFREEZING HOLD TIME AND ANTIOXIDANT SPRAY ON STORAGE STABILITY OF FROZEN EVISCERATED TURKEYS. M. F. Pool, H. L. Hanson, and A. A. Klose, Poultry Science 29(3):347-350, May, 1950. Frozen eviscerated turkey halves were stored 18 months under various conditions. Holding at 36°F. for 30 hours prior to freezing, compared to immediate freezing, did not result in detectable flavor differences. Application of NDGA in propylene glycol reduced the peroxides and off odors, as compared with the propylene glycol control, but had no effect on quality of cooked meat.

THE ESSENTIAL GROUPS OF LYSOZYME, WITH PARTICULAR REFERENCE TO ITS REACTION WITH IODINE. H. L. Fraenkel-Conrat, Arch. Biochem. 27(1):109-124, June, 1950. Lysozyme is inactivated by reactions affecting its amine, carboxyl, amide, guanidyl, or hydroxyl groups. Chemical attack on indole groups appears less harmful. Action of excess iodine at pH 7.6 leads to some loss of activity, which is partly regenerated in early stages by reducing agents. The imidazole group participates in reactions; iodination of a nitrogen atom probably accounts for the reversible inactivation. Only about half the phenolic groups react under such conditions and appear to play a minor role in activity. Sulfhydryl groups are not present. Disulfide bonds are comparatively unreactive, unless the protein has been denatured. Extensive reduction and subsequent alkylation of thd (reversibly) denatured protein causes loss of activity.

RICE

AIC-258, RICE CURLS--A NEW FOOD PRODUCT FROM RICE. R. L. Roberts, E. B. Kester, and D. F. Houston, Feb., 1950. Rice curls are a new snack food item comparable to corn and potato chips. They can be manufactured inexpensively from broken grains of rice by forming a paste with hot water, extrusion, and frying in hot vegetable oil.

AIC-273, RICE CURLS--PRODUCTION AND COST. O. R. Vasak, May, 1950. General estimates of costs, including equipment, building, raw materials, packaging, labor, and other items, for the manufacture of a new product called rice curls, are presented.

SECOND ANNUAL CONFERENCE ON RICE, Western Regional Research Laboratory, March 27-28, 1950 (mimeographed). Report of papers presented and of discussions. Summaries of research at Western and Southern Regional Research Laboratories. Also discussion of "Rice Research Needs," by L. C. Carter, Arkansas Rice Growers' Cooperative, Stuttgart, Ark., and "Nutritional Aspects of Rice," by Agnes F. Morgan, University of California.

VEGETABLES

TIME LAPSE GETS TOP BLAME FOR SHELLED PEA OFF-FLAVOR. W. F. Talburt and R. R. Legault, Food Indus. 22(6):1021-1023, June, 1950. Experiments reported have shown that off-flavor associated with delay between shelling and processing of fresh frozen peas is not due to vine juice, products of respiration, bacteria, or other external environmental factors.

ROLE OF BRUISING AND DELAY IN THE DEVELOPMENT OF OFF-FLAVOR IN PEAS. R. U. Makower and A. C. Ward, Food Technol., 4(2):46-49, Feb., 1950. Organoleptic studies indicate that peas require both bruising and a period of delay to produce "delay" off-flavor and deterioration of texture and color. These effects occur in the absence of micro-organisms, are accentuated by increased bruising or delay, but are not produced by bruising alone, or delay alone (for 24-30 hours at 75°F.).

EFFECT OF STEAM BLANCHING ON QUALITY OF FROZEN PEAS. R. R. Legault, W. F. Talburt, H. L. Hanson, and L. R. Leinbach, Food Technol. 4(5):194-199, May, 1950. Prolonged blanching of peas at 212°F., in steam, up to three times adequacy based on peroxidase test, had little effect on quality. Loss of 5 percent of total solids can be expected even under almost ideal conditions. Blanching at 190°F., even beyond adequacy, results in lower percentages of ruptured skins as compared with 212°F.

EFFECT OF STORAGE TEMPERATURE ON QUALITY OF FROZEN PEAS. F. E. Lindquist, W. C. Dietrich, and M. M. Boggs, Food Technol. 4(1):5-9, Jan., 1950. Carefully prepared samples of frozen peas were stored at -10°, 0°, and 10°F. The stored material was examined at intervals by experienced judges to determine rate at which changes occurred. Appraisal was made by the triangular plan and results were analyzed for significance.

VALUE OF STARCH COATING IN THE PRESERVATION OF QUALITY OF DEHYDRATED CARROTS, M. P. Masure, G. S. Bohart, E. J. Eastmond, and M. M. Boggs, Food Technol. 4(3):94-97, March, 1950. The storage life of dehydrated carrots at 84°F. in cellophane was increased 4 to 6 times by a coating of 2.5 percent solution of laundry starch sprayed on the hot dice as they came from the steam blancher. In comparative tests sulfiting was of little or no value.

PROCESSING QUALITY OF VARIETIES AND STRAINS OF DRY BEANS. H. J. Morris, R. L. Olson, and R. C. Bean, Food Technol. 4(6):247-251, June, 1950. The factors studied were rates of water imbibition, hardshell beans in samples, effect of hot water on hardshell beans, cooking and processing qualities, and effect of relative humidities on equilibrium moisture content.

QUICK TEST OF SWEET CORN QUALITY. K. T. Williams, E. A. McComb, and B. L. Washauer, Food Indus. 22(3):458-459, March, 1950. A rapid method for determination of moisture in sweet corn consists of grinding the corn, reacting a sample with calcium carbide, determining loss of acetylene formed by loss in weight, and calculating the water equivalent of the acetylene.

SECOND ANNUAL CONFERENCE ON POTATOES, Western Regional Research Laboratory, Oct. 17-18, 1949 (mimeographed). Report of papers presented and discussions. The first annual conference was held at Eastern Regional Research Laboratory in 1948. Subjects included research under way at Eastern and Western Regional Laboratories, research problems as viewed by industrial concerns, gravity grading, storage, transport, prepeeling, sloughing, potato chip problems, and others.

METHOD OF COOLING COMPRESSED BLOCKS OF DEHYDRATED VEGETABLE MATTER. Patent No. 2,507,550 to G. S. Smith, patented May 16, 1950. Heated blocks of compressed vegetable matter are cooled while under partial restraint to allow limited expansion to take place whereby to produce blocks of fixed size and shape.

WHEAT

PREPARATION OF WHEAT FLOUR PENTOSANS FOR USE IN RECONSTITUTED DOUGHS. J. W. Pence, A. H. Elder, and D. K. Mecham, Cereal Chem. 27(1):60-66, Jan., 1950. Simple procedures were developed for the preparation of wheat flour pentosans. Baking tests with reconstituted doughs indicated that soluble pentosans affect dough properties but fail to influence baking behavior significantly.

UNCLASSIFIED

STUDIES ON CULTURAL REQUIREMENTS OF CLAVICEPS PURPUREA AND INACTIVATION OF ERGOTAMINE. H. D. Michener and N. Snell, Amer. Jour. Bot. 37(1):52-59, Jan., 1950. The fungus, Claviceps purpurea, was cultured on nutrient media in an effort to produce ergot alkaloids artificially. Although production was not accomplished, nutritional requirements for growth of the organism were determined.

ASCORBIC ACID FROM WALNUT HULLS. A. A. Klose, J. B. Stark, G. G. Purvis, J. Peat, and H. L. Fevold, Indus. and Engin. Chem. 42(2):387-391, Feb., 1950. In studies on recovery of ascorbic acid from waste green walnut hulls, an over-all yield of crystalline product of 25 to 50% was obtained. Experimental details are presented for extraction in dilute aqueous sulfur dioxide, purification of extract by anion exchange resin, and crystallization. Pilot-plant extraction operations were conducted. Economic analysis indicates that process is marginal unless other use can be made of the equipment.

METHOD OF ISOLATION OF USNIC ACID FROM RAMALINA RETICULATA. J. B. Stark, E. D. Walter, and H. S. Owens, Jour. Amer. Chem. Soc. 1819-1820, April, 1950. Describes a satisfactory method for the production of kilogram lots of usnic acid from the lichen Ramalina reticulata. Solubility of usnic acid was determined in several solvents at three temperatures. D-arabitol was identified in the acetone extract of the lichen.

OPTICAL, CRYSTALLOGRAPHIC AND X-RAY DIFFRACTION DATA FOR USNIC ACID. F. T. Jones and K. J. Palmer, Jour. Amer. Chem. Soc. 72(4):1820-1822, April, 1950. Crystals of usnic acid isolated from the lichen Ramalina reticulata have been examined by the methods of optical crystallography and X-ray diffraction.

VACUUM DRIER WITH AUTOMATIC CAPPING DEVICE. Patent No. 2,494,541 to H. K. Burr and B. Makower, patented Jan. 17, 1950. This device is useful in desiccating samples for laboratory use. The main feature is an automatic mechanism which seals the vessels containing the samples when the vacuum is broken thereby preventing rehydration of the samples.

ETHERS OF 7-HYDROXYPHENOTHIAZONE-3. Patent No. 2,504,980 to D. F. Houston, and E. B. Kester, patented April 25, 1950. The invention relates to alkyl ethers of 7-hydroxyphenothiazone-3 wherein the alkyl radical contains at least 5 carbon atoms. These compounds have bacteriostatic properties.

ALKYL ETHERS OF 3-HYDROXYPHENOTHIAZINE. Patent No. 2,505,772 to D. F. Houston, patented May 2, 1950. The invention relates to 3-alkyloxyphenothiazines wherein the alkyl radical contains at least 8 carbon atoms. These compounds, useful as dyestuff intermediates, are prepared by reacting a p-alkoxydiphenylamine with sulphur in the presence of iodine.

SOLUBILIZING TANNING BARK EXTRACTS WITH WASTE SULPHITE LIQUORS. Patent No. 2,505,818 to K. T. Williams and E. F. Potter, patented May 2, 1950. Waste sulphite liquor is modified by raising its pH to 5 and replacing the alkaline earth metal ions with alkali metal ions. The modified liquor is then heated with the bark extract to solubilize the insoluble material in the extract.